



# Deep Learning

« The man when the computer dreams »

# Introduction

- Google research blog
  - Publication of June 17th, 2015
  - Going deeper into neural networks

# Plan

- Some definitions
- Actual use
- Artistic part

# Définition 1/2

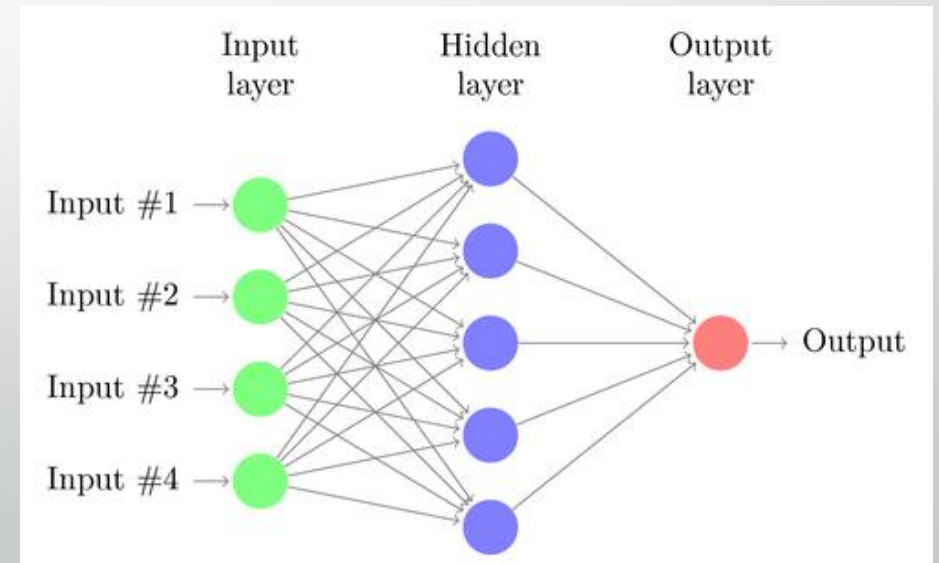
- Machine Learning :
  - Take a lot of Data
  - Take Big algorithm
  - Group twice
- Two parts :
  - Teach Parts (show the way to the algorithm)
  - Automated Parts

A special way to solve problem without understanding them

# Definition 2/2

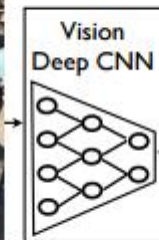
- Deep Learning
  - A class of Machine Learning (Supervised algorithm)
  - Supervised = system will learn to classify
  - Composed of neural network
    - 1 = good result
    - 0 = bad result
    - $]0;1[$  = not enough precise

*Example of neural network*

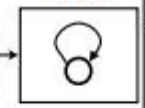


# Actual Use 1/3

- With deep learning you can :
  - Describe picture
  - Classify people
  - ... etc



Language  
Generating  
RNN

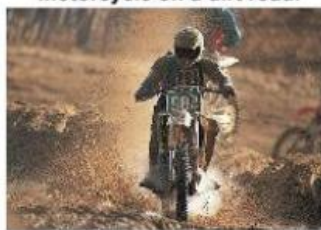


**A group of people  
shopping at an  
outdoor market.**

**There are many  
vegetables at the  
fruit stand.**

# Actual Use 2/3

A person riding a motorcycle on a dirt road.



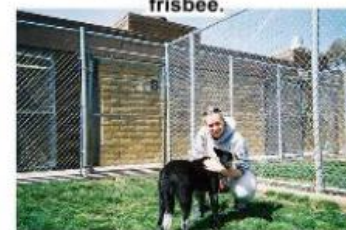
Two dogs play in the grass.



A skateboarder does a trick on a ramp.



A dog is jumping to catch a frisbee.



A group of young people playing a game of frisbee.



Two hockey players are fighting over the puck.



A little girl in a pink hat is blowing bubbles.



A refrigerator filled with lots of food and drinks.



A herd of elephants walking across a dry grass field.



A close up of a cat laying on a couch.



A red motorcycle parked on the side of the road.



A yellow school bus parked in a parking lot.



Describes without errors

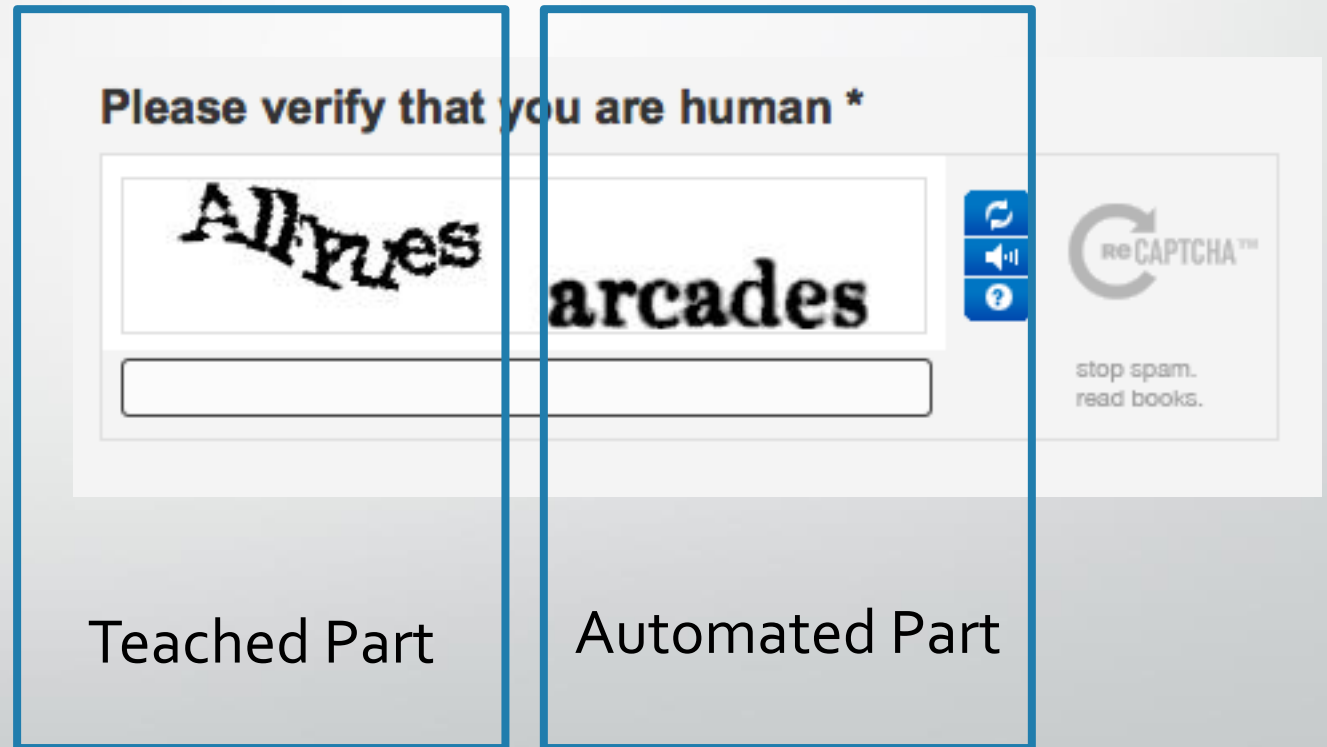
Describes with minor errors

Somewhat related to the image

Unrelated to the image

## Actual Use 3/3

- Captcha





## Artistic Part 1/2



Starry Night,  
Vincent Van  
Gogh

## Artistic Part 2/2



+

- A large Database of Images
- A sorting algorithm

# Conclusion

- Artificial Intelligence = danger for humanity ?



# Sources/Bibliography

- <http://googleresearch.blogspot.fr/2015/06/inceptionism-going-deeper-into-neural.html>
- <http://www.texample.net/tikz/examples/neural-network/>
- <http://thecreatorsproject.vice.com/blog/what-do-computers-dream-of-when-they-look-at-art>
- <http://arxiv.org/pdf/1411.4555v1.pdf>



Questions ?

# To go further

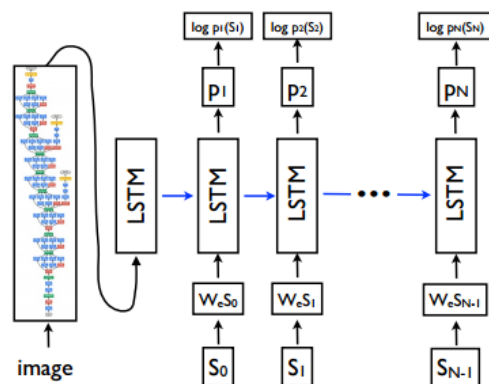


Figure 3. LSTM model combined with a CNN image embedder (as defined in [30]) and word embeddings. The unrolled connections between the LSTM memories are in blue and they correspond to the recurrent connections in Figure 2. All LSTMs share the same parameters.

# Long short Term Memory

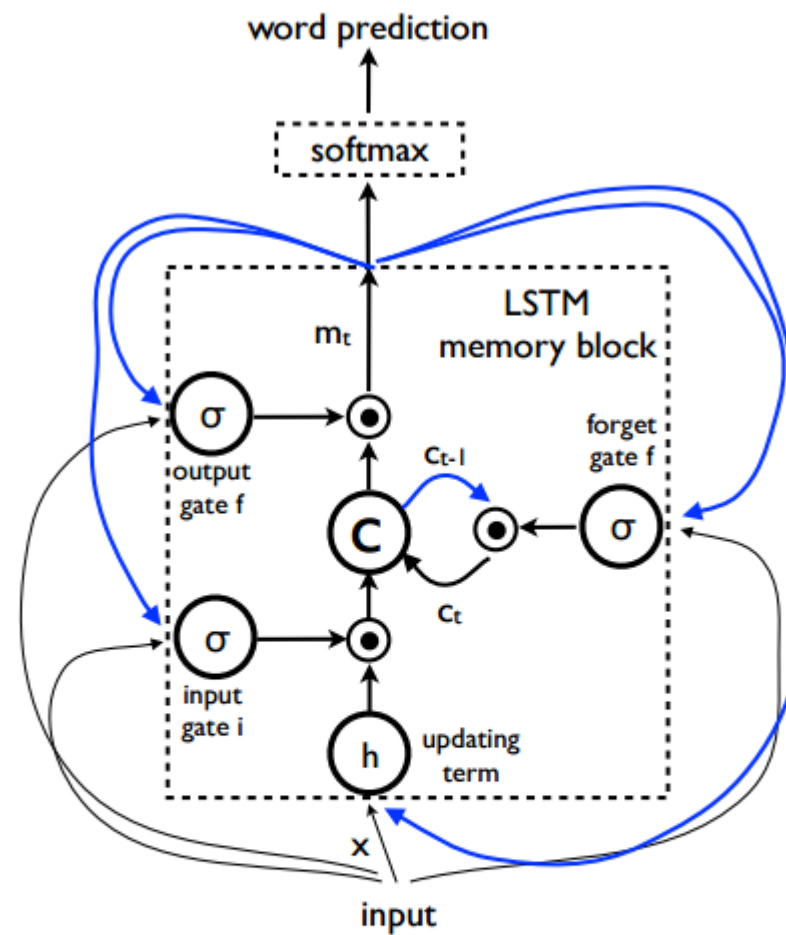


Figure 2. LSTM: the memory block contains a cell  $c$  which is controlled by three gates. In blue we show the recurrent connections – the output  $m$  at time  $t - 1$  is fed back to the memory at time  $t$  via the three gates; the cell value is fed back via the forget gate; the predicted word at time  $t - 1$  is fed back in addition to the memory output  $m$  at time  $t$  into the Softmax for word prediction.

# Few more pictures



*The Persistence of Memory, Salvador Dalí*

# Few more pictures



*The Son of Man, René Magritte*



# Few more pictures



*The Last Supper, Leonardo DaVinci*

# Few more pictures



*The Birth of Venus, Sandro Botticelli*

# Find more

- <https://www.deepdreamit.com>